

Message Text

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ORIGIN SCI-06

INFO OCT-01 EA-11 ISO-00 EB-11 COME-00 TRSE-00 OMB-01

INT-08 SCEM-02 CIAE-00 INR-10 NSAE-00 RSC-01 NSF-04

SS-15 NSC-10 L-03 /083 R

DRAFTED BY SCI/AE:MBCONGDON:FEJ

APPROVED BY SCI/AE:HDBREWSTER

EA/J - MR. PIEZ

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R 102101Z OCT 73

FM SECSTATE WASHDC

TO AMEMBASSY TOKYO

UNCLAS STATE 200930

E.O. 11652: N/A

TAGS: TECH, ENRG, JA

SUBJ: US-JAPAN AGREEMENT ON ENERGY R&D

REFS: A. TOKYO 12209; B. STATE 158178

1. SENT FOR TRANSMITTAL TO GOJ AT DISCRETION OF EMBASSY
ARE STATE-OF-ART DESCRIPTIONS OF THREE TECHNOLOGIES FROM
LIST TRANSMITTED REF. B: (B) SOLAR ENERGY APPLICATIONS,
(G) ELECTRICAL POWER GENERATION BY COMBUSTION OF WASTE
MATERIALS, AND (I) ELECTRICAL, MECHANICAL, PHYSICAL AND
CHEMICAL PROPERTIES OF MATERIALS USED IN HIGH TEMPERATURE
POWER CYCLES.

(B) SOLAR ENERGY APPLICATIONS

US SOLAR ENERGY PROGRAM, UNDER NSF LEADERSHIP, FORMU-
LATED AROUND SIX PROGRAM AREAS: 1) HEATING AND COOLING OF
BUILDINGS, 2) SOLAR THERMAL CONVERSION, 3) PHOTOVOLTAIC
CONVERSION, 4) BIOCONVERSION, 5) WIND ENERGY CONVERSION,
AND 6) OCEAN THERMAL DIFFERENCE CONVERSION. SOME SOLAR
ENERGY APPLICATION AREAS (E.G., WATER DISTILLATION, COOK-
ING, MINERALS RECOVERY, CROP DRYING) ARE NOT INCLUDED IN
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SIX AREAS AND LITTLE RESEARCH IS BEING PURSUED AT THIS

TIME. RESEARCH ON INSOLATION DATA, ENERGY STORAGE, MATERIALS, INFORMATION SYSTEMS, ARE INCLUDED WITHIN ABOVE AREAS.

MOST APPLICATIONS IN DESIGNATED AREAS CONSIDERED TO BE TECHNICALLY FEASIBLE IN THAT SYSTEMS HAVE BEEN IN OPERATION OR COMPONENTS AND SUBSYSTEMS MAKING UP SYSTEM HAVE BEEN OPERATED SUCCESSFULLY. HOWEVER, TECHNOLOGY IS NOT ACCEPTABLE ECONOMICALLY AND SOCIALLY IN COMPETITION WITH ALTERNATIVE APPROACHES. US SCIENTISTS AND ENGINEERS HAVE CONDUCTED ASSESSMENTS OF TECHNOLOGY IN EACH PROGRAM AREA. PROBABILITY HIGH FOR SUBSTANTIAL IMPROVEMENT IN SYSTEM PERFORMANCE AND REDUCTION IN ENERGY CONVERSION COSTS, AND FOR IMPROVED ECONOMIC, SOCIAL, AND ENVIRONMENTAL ACCEPTANCE.

NSF PROGRAM ORGANIZED TO UNDERTAKE COMPONENT AND SUBSYSTEM PROOF-OF-CONCEPT EXPERIMENTS IN AT LEAST THREE AREAS WITHIN FIVE YEARS. SYSTEM PROOF-OF-CONCEPT EXPERIMENT IN DEMONSTRATION OF PRACTICAL SYSTEM DESIGNED, CONSTRUCTED, AND TESTED BY USERS AND INDUSTRY TO OBTAIN PERFORMANCE DATA AND VERIFICATION OF PROJECTED ECONOMICS. SOCIAL AND ENVIRONMENTAL FACTORS LEADING TO TECHNOLOGY IMPLEMENTATION AND UTILIZATION ARE ALSO STUDIED.

THREE PROGRAM AREAS IDENTIFIED FOR EARLY SYSTEM PROOF-OF-CONCEPT EXPERIMENTS ARE 1) HEATING AND COOLING OF BUILDINGS, INCLUDING WATER HEATING, 4) BIOCONVERSION OF WASTE ORGANIC MATERIALS TO PRODUCE METHANE GAS, AND 5) WIND ENERGY CONVERSION TO PRODUCE ELECTRICITY.

FIRST PHASE OF RESEARCH HAS BEEN INITIATED IN HEATING AND COOLING OF BUILDINGS PROGRAM. MULTIPLE CONTRACTS FOR SYSTEM STUDIES WILL IDENTIFY THE MOST PROMISING EXPERIMENTS IN FISCAL YEAR 1974. THESE SYSTEM STUDIES WILL EXAMINE THE MOST PROMISING COMBINATIONS OF HEATING AND COOLING COMPONENTS AND SUBSYSTEMS IN CONJUNCTION WITH REGIONS OF THE COUNTRY, TYPE OF BUILDING, AND ENERGY NEEDS. A NUMBER OF THE MOST INTERESTING PRACTICAL APPLICATIONS UNCLASSIFIED

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WILL BE PURSUED THROUGH PRELIMINARY SYSTEM DESIGN, SUPPORTING RESEARCH, FINAL DESIGN, CONSTRUCTION, TEST, AND EVALUATION.

FIRST PHASE IN PROOF-OF-CONCEPT EXPERIMENTS IN WIND ENERGY CONVERSION AND BIOCONVERSION WILL BE INITIATED WITHIN YEAR IF PRESENT SUBSYSTEM AND ENGINEERING SYSTEM RESEARCH SHOW CONTINUING PROGRESS.

(G) ELECTRICAL POWER GENERATION BY COMBUSTION OF
WASTE MATERIALS

USE OF SOLID WASTE MATERIALS AS SOURCE OF ENERGY FOR
GENERATION OF ELECTRICITY IS BEING DEVELOPED AND VARIOUS

TECHNIQUES AND PROCESSES CURRENTLY UNDERWAY. SEVERAL
PROJECTS EXPLORE DIRECT USE OF SOLID WASTE AS PRIMARY
FUEL OR USE OF FUEL PRODUCT OF VARIOUS PYROLYTIC METHODS
AS FUEL. IN PYROLYSIS, ORGANIC WASTE IS TREATED IN
ABSENCE OF OXYGEN, AND PYROLYTIC OIL, GAS, OR CHAR ARE
GENERATED WITH INORGANIC RESIDUE LEFT BEHIND. SOME KEY
PROGRAMS:

COMBUSTION/INCINERATION

1) INCINERATION AND ENERGY RECOVERY BY WATER WALL.
PROJECT: NORTHWEST INCINERATOR, CHICAGO, ILLINOIS. ONE
OF A NUMBER OF SYSTEMS USING AN INCINERATOR TO GENERATE
STEAM. THIS IS A MODERN WATER-WALL INCINERATOR DESIGNED
TO HANDLE 1600 TONS/DAY IN THE "AS RECEIVED" STATE
SHREDDED WITH THE FERROUS MATERIAL REMOVED MAGNETICALLY.

2) SUPPLEMENTARY USE OF REFUSE IN A COAL-FIRED
BOILER. PROJECT: UNION ELECTRIC COMPANY, ST. LOUIS,
MISSOURI. PREPARED REFUSE IN THE AMOUNT OF 15 (450
TONS/DAY) IS PRESENTLY USED AS A SUPPLEMENTARY FUEL IN
TWO PULVERIZED COAL BOILERS. REFUSE IS MILLED AND
PNEUMATICALLY TRANSFERRED AND THEN COMBUSTED. EVENTUALLY,
20 BY HEAT VALUE IS EXPECTED TO BE ATTAINED IN THIS
ONGOING DEMONSTRATION.

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3) FLUID BED COMBUSTOR FEEDING GAS TO A GAS TURBINE-
DRIVEN ELECTRIC GENERATOR. PROJECT: "CPU-400" OF THE
COMBUSTION POWER COMPANY, MENLO PARK, CALIFORNIA. MIXED
REFUSE IS SHREDDED, CLASSIFIED AND BURNED IN A FLUID BED
AT THE RATE OF 400 TONS/DAY, PRESENTLY AT A 1/5 SCALE
PILOT PLANT STAGE.

4) DESIGN AND FEASIBILITY OF A FULL WASTE STEAM/-
ELECTRIC GENERATING PLANT. PROJECT: HENNEPIN COUNTY,
MINNESOTA. PRESENTLY IN THE FEASIBILITY/PLANNING STAGE,
THIS PROJECT WOULD USE THE WASTE FROM CITY OF MINNEAPOLIS
(2000 TONS/DAY) TO GENERATE STEAM AND ELECTRICITY FOR THE
CEDAR RIVERSIDE NEW COMMUNITY, THE UNIVERSITY OF MINNESOTA,
AND OTHERS.
PYROLYSIS

1) FLASH PYROLYSIS AND STEAM GENER

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Message Attributes

Automatic Decaptioning: X
Capture Date: 01 JAN 1994
Channel Indicators: n/a
Current Classification: UNCLASSIFIED
Concepts: RESEARCH & DEVELOPMENT AGREEMENTS
Control Number: n/a
Copy: SINGLE
Draft Date: 10 OCT 1973
Decaption Date: 01 JAN 1960
Decaption Note:
Disposition Action: n/a
Disposition Approved on Date:
Disposition Authority: n/a
Disposition Case Number: n/a
Disposition Comment:
Disposition Date: 01 JAN 1960
Disposition Event:
Disposition History: n/a
Disposition Reason:
Disposition Remarks:
Document Number: 1973STATE200930
Document Source: CORE
Document Unique ID: 00
Drafter: MBCONGDON:FEJ
Enclosure: n/a
Executive Order: N/A
Errors: N/A
Film Number: n/a
From: STATE
Handling Restrictions: n/a
Image Path:
ISecure: 1
Legacy Key: link1973/newtext/t19731040/aaaabdgk.tel
Line Count: 166
Locator: TEXT ON-LINE
Office: ORIGIN SCI
Original Classification: UNCLASSIFIED
Original Handling Restrictions: n/a
Original Previous Classification: n/a
Original Previous Handling Restrictions: n/a
Page Count: 4
Previous Channel Indicators:
Previous Classification: n/a
Previous Handling Restrictions: n/a
Reference: A. TOKYO 12209; B. STATE 158178
Review Action: RELEASED, APPROVED
Review Authority: kelleyw0
Review Comment: n/a
Review Content Flags:
Review Date: 05 DEC 2001
Review Event:
Review Exemptions: n/a
Review History: RELEASED <05-Dec-2001 by bryansd0>; APPROVED <11 MAR 2002 by kelleyw0>
Review Markings:

Declassified/Released
US Department of State
EO Systematic Review
30 JUN 2005

Review Media Identifier:
Review Referrals: n/a
Review Release Date: n/a
Review Release Event: n/a
Review Transfer Date:
Review Withdrawn Fields: n/a
Secure: OPEN
Status: NATIVE
Subject: US-JAPAN AGREEMENT ON ENERGY R&D
TAGS: TECH, ENRG, JA
To: TOKYO
Type: TE
Markings: Declassified/Released US Department of State EO Systematic Review 30 JUN 2005